CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 86-21

WASTE DISCHARGE REQUIREMENTS FOR:

THE CLOROX COMPANY
850 - 42ND AVENUE
OAKLAND, ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board), finds that:

1. The Clorox Company, hereinafter called the discharger, by application dated December 12, 1985 has applied for issuance of waste discharge requirements.

2. The discharger's site occupies one block in an industrialized area of Oakland at High Street, about 0.4 miles east-northeast of the Alameda-Oakland Estuary (Attachment 1).

3. The discharger began a site investigation in 1980 in order to satisfy Federal Resource Conservation Recovery Act (RCRA) requirements. Through the course of this investigation, elemental mercury was discovered in fill soils beneath the site. Elemental mercury was used at the facility in concrete cells to manufacture chlorine and sodium hydroxide for liquid chlorine bleach during the years 1919 to 1957. Old cells which had become inefficient were crushed and a retorting process employed to recover mercury. Concrete remnants from the cells, after retorting of mercury, were used as fill material in some areas on the plant grounds from 1919 to 1945. In 1957, the discharger stopped producing chlorine bleach in this manner for economic reasons.

4. Approximately 3000 pounds of elemental mercury are estimated to exist beneath the plant (Attachment 2). The site is virtually sealed from the surface environment by concrete floor slabs in plant buildings and by paved parking areas. A maximum of about 18 pounds of mercury are estimated to have migrated off-site in shallow groundwater since production began at the plant in 1919. Approximately 28 pounds of mercury are contained in the groundwater on-site.

5. The site is underlain predominately by clays which contain lenses of sandy and gravelly soils. A shallow-zone aquifer exists from about 8 to 18 feet with deeper aquifers at 40 to 80 feet, 120 to 140 feet and 200 to 230 feet below ground surface.

6. The Highway 185 roadway adjacent to the site is an underpass about 20 feet below land surface. The dewatering system of Highway 185 consists of filter gravel and perforated drain pipes for shallow-zone groundwater removal. Groundwater samples from an underground drain pipe located at the underpass near the discharger's plant contain maximum concentrations of mercury up to 8.1 ppb and an average concentration of 3.5 ppb, based upon monitoring data collected monthly since October, 1983. The drain pipes discharge into a storm drain system. Groundwater and surface runoff from Highway 185 eventually discharge into the Alameda-Oakland Estuary, a part of Lower San Francisco Bay. Due to dilution, the concentration of mercury in the outfall into the estuary is below the detection limit of 0.1 ppb.

7. The lateral and vertical extent of mercury pollution is generally defined by 22 groundwater monitoring wells located on and off-site. There are 13 wells which monitor groundwater in the shallow zone and 9 wells which monitor deeper groundwater zones, to a maximum depth of 240 feet. The estimated average concentration of mercury in shallow groundwater along the western side of the Clorox plant, where the groundwater passes from the site to the Highway 185 subdrain system, is about 2000-3000 ppb. Groundwater from one shallow on-site well has contained concentrations of mercury up to 10,000 ppb. Mercury has never been detected in any of the deeper monitoring wells below the shallow groundwater zone.

8. On July 23, 1985, Regional Board staff received from the discharger a report entitled "Remedial Action Assessment, Clorox, Oakland Plant". In the report, three cleanup alternatives were presented and examined in detail. Two of the alternatives include immediate remedial construction to intercept and treat polluted groundwater, but differ in the scope of construction and cost, one being more extensive than the other. The remaining alternative includes extensive groundwater monitoring with a remedial construction contingency only if elevated mercury levels are encountered in the off-site area. The report indicates that

other alternatives besides these three were also examined but were determined to be either impractical or not cost effective.

9. The discharger has selected the most comprehensive alternative from these three consisting of groundwater monitoring and extensive remedial construction. Polluted, shallow groundwater will be extracted and treated at the site in order to contain and cleanup the mercury plume and to minimize the amount of mercury reaching San Francisco Bay. This is an acceptable remedial program for the site. This groundwater extraction and treatment will continue for the forseeable future.

10. The discharger proposes to construct an underground gravel drain along the west side of the plant site. This drain and the Highway 185 dewatering system will intercept shallow groundwater which will be pumped to an off-site wastewater treatment system, to be constructed on the Clorox property near the plant site. The drain and pumping system will create a reversal in the shallow groundwater flow direction in the off-site area west of the plant. The result of this flow reversal is that about 13.5 pounds of the estimated maximum of 18 pounds of mercury present in the off-site shallow groundwater will either be retrieved back to the gravel drain or immobilized in the soils. The discharger believes the concentration of mercury in the subdrain at Highway 185 near their plant will decrease with time. The proposed drain will preclude off-site migration of polluted groundwater on-site.

    The proposed groundwater treatment system consists of equilization, precipitation, filtration; pH adjustmente; ion exchange; carbon adsorption; additional pH adjustment and aeration prior to discharge into the Oakland Estuary and San Francisco Bay.

11. The proposed treatment system should remove more than 99% of the mercury present in the extracted groundwater.

12. The Board adopted a revised Water Quality Control Plan (Basin Plan) for the San Francisco Bay Region on July 21, 1982. The Basin Plan contains water quality objectives for Oakland Estuary and San Francisco Bay. The Basin Plan also contains water quality objectives for groundwater.

13. The beneficial uses of Oakland Estuary and South San Francisco Bay include:

- Recreation
- Fish migration and habitat
- Estuarine habitat
- Warm fresh water and cold fresh water habitat
- Fish spawning and migration
- Industrial service supply
- Shellfishing
- Navigation
- Open commercial and sport fishing

14. The potential beneficial uses of the groundwater underlying the facility include:

a. Industrial process water supply
b. Industrial service supply
c. Domestic supply
d. Agricultural supply

15. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

16. This project constitutes a minor modification to land and such activity is thereby exempt from the provisions of the California Environmetal Quality Act (CEQA) in accordance with Section 15304 of the Resources Agency Guidelines.

17. The Board, in a public meeting, heard and considered all comments pertaining to the discharge. The meeting was conducted jointly with the Department of Health Services and it is the intent of the Board that this Order be consistent with the remedial action plan approved by the Department pursuant to the Health and Safety Code.

IT IS HEREBY ORDERED, that The Clorox Company, Oakland, in order to meet the provisions contained in Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of waste or hazardous material in a manner which will degrade water quality or adversely affect the beneficial uses of the groundwaters of the State is prohibited.

2. The discharge of wastes or hazardous materials through surface runoff or through subsurface transport which will degrade the water quality or adversely affect the beneficial uses of the surface waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of the pollution is prohibited.

4. Bypassing extracted groundwater from the treatment system to waters of the State is prohibited. If bypassing should occur, the discharger shall notify this Board's Executive Officer as soon as possible.

B. SPECIFICATIONS

1. The potential for private wells in the area of pollution to act as conduits for the spread of pollution shall be identified. Wells identified as actual or potential conduits shall be properly sealed or abandoned, to the extent legally possible.

2. Concentrations of mercury in the Highway 185 subdrain water, or at shallow-zone monitoring well nos. 45 and 46 shall not increase above the concentrations stipulated in B.7 below.

3. The treatment or disposal of waste shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

4. Groundwater extracted for treatment shall receive the treatment specified in the NPDES permit prior to discharge.

5. The vertical and lateral extent of pollution shall be defined at all times. Should monitoring results show evidence of plume migration, additonal plume characterization shall be required.

6. Mercury concentrations shall be monitored on a monthly basis for the next year at the Highway 185 subdrain pipe No. D-3 and at the off-site monitoring wells Nos. 45 and 46. Subsequent monitoring will then be performed quarterly (every three months thereafter for the next 4 years at these locations).

7. The measured mercury concentrations at the Highway 185 subdrain pipe No. D-3 shall not be allowed to exceed a maximum value of 0.010 ppm for any continuous period of three months, nor a value of 0.0085 ppm for any continuous period of six months, based upon time-weighted average measurements. For off-site monitoring wells Nos. 45 and 46, three and six month limiting mercury concentrations shall be established based upon the monthly monitoring data to be obtained from these wells during the next year.

C. PROVISIONS

1. The discharger shall commence with the approved remedial action measures as described in Findings 9 and 10 immediately upon adoption of this Order.

2. The discharger shall report to the Board annually, with the first report due July 15, 1987, on the effectiveness of the groundwater containment and cleanup program. The report shall discuss the treatment of the extracted groundwater, the status of the underground waste plume containment, expected results of future extractions, and any problems encountered during implementation of the cleanup plan.

3. The discharger shall submit to the Board, technical reports on self-monitoring work performed according to a program approved by the Board's Executive Officer.

4. In order to comply with Prohibition A.1, the discharger shall place the bottom of the proposed drainage gallery at least one foot below the base of any sand lenses which may occur in the sandy clay layer overlying the silty clay aquitard. Furthermore, the discharger shall submit a proposal acceptable to the Executive Officer on final plans, specifications, and construction quality control 30 days prior to the beginning of gallery and well construction. The proposal shall include at a minimum the following:

a. Proposed drilling methods, gallery and well construction methods, well development methods, soil and groundwater sampling and testing methods and treatment system testing methods.

b. Soil boring logs and tests, water quality, and any other information used as a basis for developing the proposed final plans and specifications.

c. A report documenting the presence or absence of sandy lenses along the gallery alignment.

5. During excavation, the gallery walls shall be visually inspected and logged as feasible and practical in underground construction, to determine whether any sand lenses are present within one foot of the hole bottom. During final design studies, any modifications which may substantially impact the gallery design shall be submitted by June 15, 1986.

6. In order to comply with Specification B.1, the discharger shall meet the following time schedule:

Task	Completion Date
a. Assess any threat posed by wells of record, which may be identified as actual or potential conduits of pollution.	April 15, 1986
b. Develop a program and time schedule acceptable to the Executive Officer to eliminate any identified or potential the threat posed by wells identified in 6.a. above. Evaluate the options available for eliminating any identified cross-pollution threat and the rationale that will be used for selecting and implementing an appropriate option for each identified well.	May 15, 1986

c. Implement the program approved in Provision 6.b. — June 15, 1986

7. In order to comply with Specification B.5., the discharger shall assess and report whether an additional monitoring well in the intermediate aquifer zone in the general location south of High Street and south, southeast of well no. 23 may be needed and cost effective. A report on the findings of this task shall be submitted by May 15, 1986.

8. Documentation of compliance with the Specifications and Provisions in this Order shall include: all pre-construction design reports; final construction drawings and specifications; construction monitoring and performance reports; post-construction groundwater gradient contour maps; laboratory analyses; and other design, construction, monitoring results which the Board staff may deem necessary and appropriate.

   This domentation shall be updated and submitted with each technical report required under this Order, as appropriate.

9. All samples shall be analyzed by State certified laboratories using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board review. If the discharger chooses to use its own laboratory for the analytic work, ten percent of all water samples shall be split and analyzed by an outside laboratory.

10. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

    a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept.

    b. Access to copy any records required to be kept under terms and conditions of this Order.

    c. Inspection of any monitoring equipment or methods required by this Order.

d. Sampling of any groundwater or soil which is accessible, or may become assessible as part of any investigation or remedial action program, to the discharger.

11. The discharger shall file a report on any material changes in the nature, quantity, or transport of polluted groundwater associated with the pollution described in this Order.

12. The discharger shall maintain in good working order and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

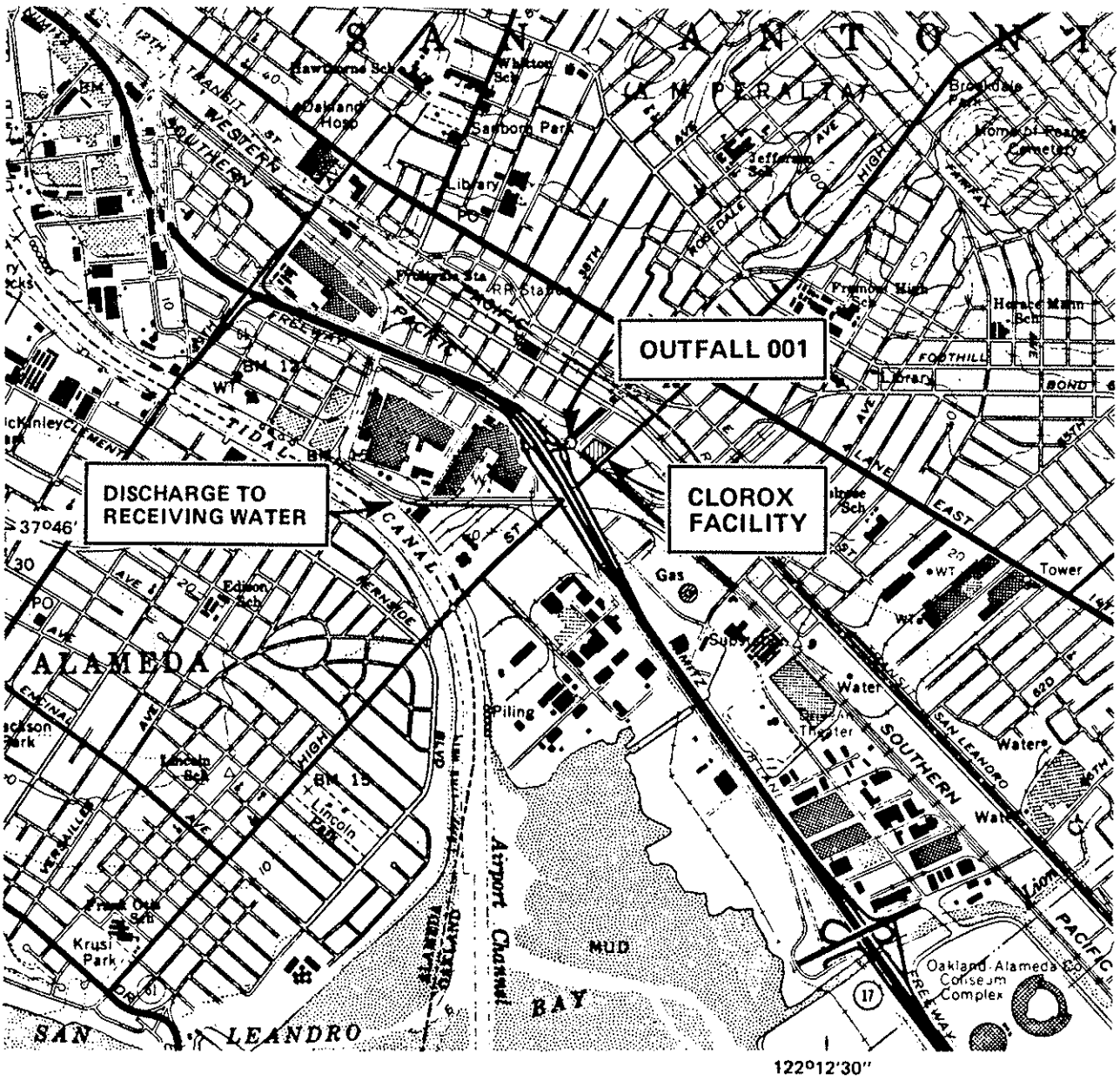
13. The Board will review this Order periodically and may revise the requirements when necessary.

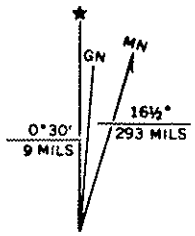
I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 19, 1986.

ROGER B. JAMES
Executive Officer

Attachments:

1. Site Location Map
2. Site Map
3. Notice of DOHS Hearing





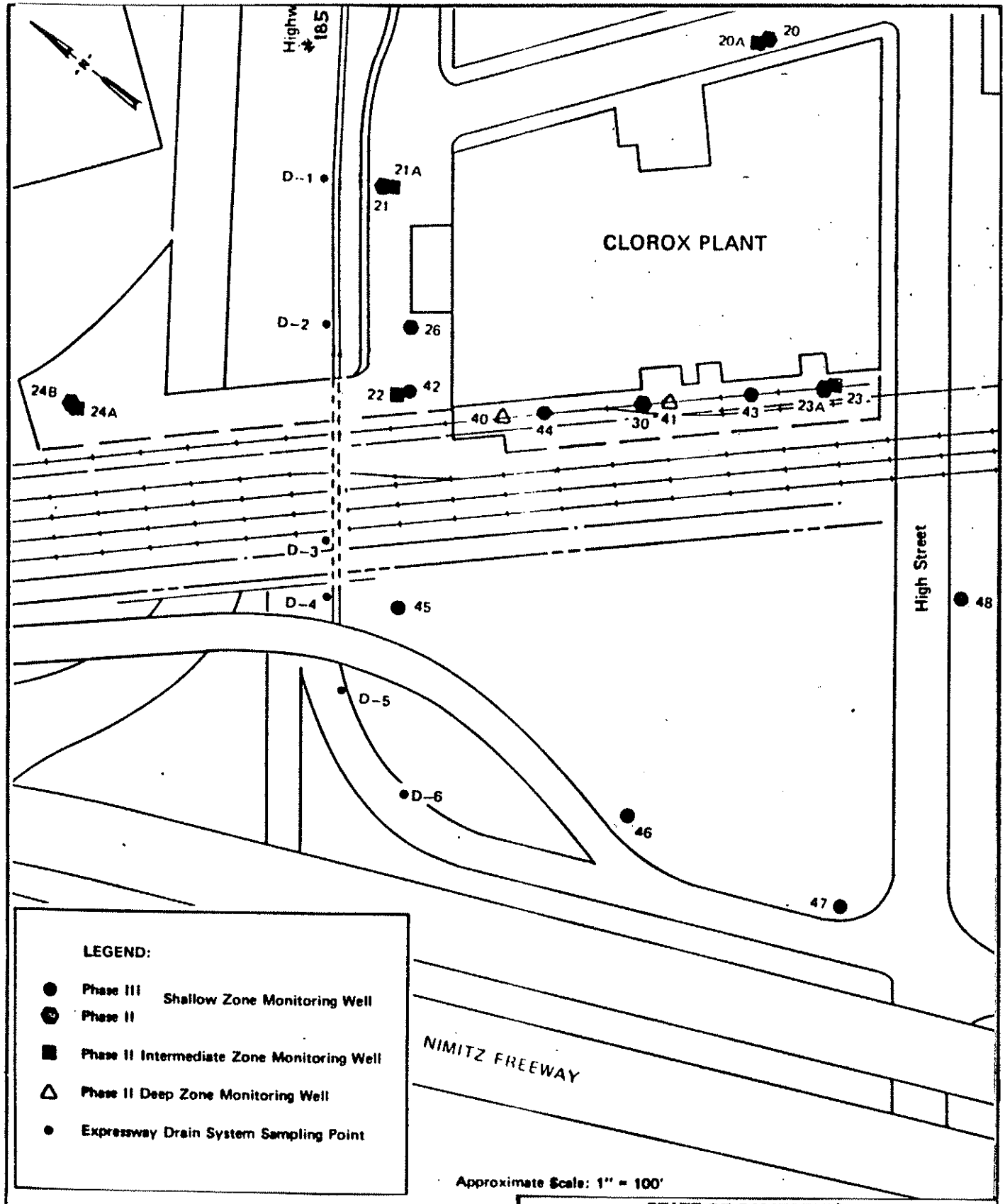
USGS Map
Oakland East, California
Scale 1:24,000

0 1,000 2,000 3,000 4,000 5,000 feet

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT 1
SITE LOCATION MAP
THE CLOROX COMPANY
OAKLAND, ALAMEDA COUNTY

DRAWN BY: [illegible] DATE: 9-3-86 DRWG. NO.



STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT 2
SITE MAP
THE CLOROX COMPANY
OAKLAND, ALAMEDA COUNTY

DRAWN BY:	DATE: 2-3-86	DRWG. NO.